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Some Peculiarities in the Seed of *Smilax*, Tourn.

Moderate pressure upon a fresh ripe berry of *Smilax auriculata*, Walt., forces out of it one, two or (commonly) three more or less rounded masses of grayish horny albumen, each enclosed in a thin smooth brownish closely adherent coat, marked with a darker-colored, suborbicular hilum at the base, and with a distinct dark raised point or minute tubercle at the opposite end, indicating the position of the small white oblong embryo. These albuminous bodies have been universally taken for the complete seeds by writers upon *Smilax* from Gærtner to Gray. A careful dissection of some scores of ripe berries of *S. auriculata*, Walt., and green but full-grown berries of *S. lanceolata*, L., enables me to assert positively that this view is not strictly correct, at least as regards these and some other closely allied species.

The firm outer skin of the fresh ripe berry of *S. auriculata* encloses a thin layer of subfarinaceous, but more or less juicy pulp, within which are three cells (sometimes fewer by abortion) with very thin membranaceous walls. Each cell is filled by a transparent bag of more or less elastic tissue, suspended by a short funiculus to the upper inner angle of the cell. In each case this bag contains not only a seed, ordinarily so-called, but also a small quantity of very soft, moist, dark-colored pulp, mainly lodged between the hilum and the funicular extremity of the bag. The elasticity of this bag is such that it may be stretched without breaking, to twice, thrice or even four times its original length, and will afterwards contract to scarcely more than its first size. This peculiarity is so marked that it has given a name to the common southwestern *Smilax* (the subspecies *S. Wrightii* of Alphonse de Candolle) of which a trustworthy Texan correspondent* writes: "It is commonly known as 'bramble' or 'stretch-berry,' the latter name from the thin, rubber-like covering over the seed, which is often used by children to put with chewing-gum, making the gum stretch like rubber."† In the green but full-

* Miss Sarah A. Trimble, Waco, Texas.

† This elastic seed coat is so obvious upon an even moderately careful examination that it is hard to believe that it has altogether escaped the attention of botanical writers. Nevertheless, despite extended and diligent search, I have not yet found the slightest reference to it. Moreover, the phraseology of leading authors, in more than one instance, distinctly implies that they were unaware of its existence. Among

grown berries of *S. lanceolata* the elastic coat is even more readily detected than in the ripe ones of *S. auriculata*; the dark pulp, however, appears as a layer of firm, green, fleshy tissue, thick at the base and thinly enveloping the entire mass of albumen, which is still white exteriorly and yielding (though tough) in texture. Under careful dissection the funiculus sometimes separates at its base and remains attached to the seed—projecting from the elastic coat as a minute thread-form body, perhaps a fiftieth of an inch in length. More often, in the ripe berry, it gives way at the other extremity and remains attached to the angle of the cell, presenting at the free end a saucer-like, sub-circular expansion, by which it was attached to the hilum.

It is absolutely certain that the elastic exterior coat and the enclosed pulp layer are borne upon the funiculus and must be regarded as integral parts of the seed, or as adjuncts to it, and not as any part of the pericarp. It may be questioned whether the elastic coat is testa or aril. I am myself strongly inclined to believe that it is merely the developed outer coat of the ovule and therefore the testa of the seed. Accepting this view, the brownish closely adherent covering of the albumen (testa of A. de Candolle) is really the tegmen. This structure is simple enough, and is paralleled in numerous bitunicate seeds. The fleshy and subsequently pulpy intermediate layer remains, however, a curious anomaly. Gray appears to hold (*Struc. Bot.*, ed. 1879, p. 277) that the coats of the ovule are never separated. They clearly seem to be in this case, and yet to no obvious purpose. It is a suggestive fact that in the ripe fruit the pulp enclosed within the testa (if testa it is) presents decidedly an appearance of decomposition rather than of wholesome maturity. Apparently from some distorted or at least unusual impulse, the outer coat of the ovule begins to develop some little distance below the inner. Nature, it seems, abhorring the vacuum thus formed, fills the gap with tissue, which merely serves as a pack-

writers carefully consulted on this point may be named Tournefort, Linnæus, Gärtner, Michaux, Nuttall, Torrey, Gray, Chapman, Wood, Kunth, Grisebach, A. de Candolle, Bentham and Hooker and Engler and Prantl. The hilum seems to be unmentioned, except by Kunth (*Enumeratio*) and Grisebach (*Mart. Fl. Bras.*); only Gärtner notices the tubercle at the apex. Strangely enough, Gärtner figures the embryo at the wrong end of the seed!

ing, and ultimately decomposes without having contributed anything to the vital growth or protection of the seed. Of course this view is speculative, and close microscopic observations upon the ovule, both before and after fertilization, are essential to a decisive interpretation of the structure I have described. It may even appear that the elastic coat and the intermediate layer are both developed after fertilization and are, therefore, of the nature of a double aril, tenacious without and pulpy within. A considerable resemblance certainly exists between the external coat and the loose membranaceous aril in *Castalia*, Salisb., more especially as both originate at a point below the summit of the funiculus. An aril, however (see Gray's definition, l.c., p. 308), is an accessory seed-covering, "more or less incomplete," whereas in *Smilax* the external coat is complete in every respect. At any rate, whether testa or aril, the whole subject is novel and interesting, and is strongly commended to physiological botanists and microscopists, who may have access to the fruit of *Smilax* in its earliest stages.

E. E. STERNS.

P. S.—Since writing the foregoing I have examined fresh ripe berries of *S. Walteri*, Pursh, and sub-species *S. Wrightii*, A. DC. (= *S. tamnoides*, of Chapman's Flora, in part.) In the former the exterior coat is thin and easily broken, and its elasticity is not especially marked. In *S. Wrightii*, however, the "stretch-berry" of the southwest, this coat is extraordinarily elastic, and can be readily extended without breaking to five or six times its original length! A still more recent examination, this time of very young berries of *S. pumila*, Walt., barely one-fourth the size of the ripe fruit, shows the outer coat as complete in form at this stage as at maturity, and already strikingly elastic. Although this is a strong confirmation of the testa theory, microscopic study of the ovule is still essential to settle the question absolutely.

E. E. S.

Another Station for *Rhododendron Vaseyi*.

RHODODENDRON VASEYI, Gray. Proc. Am. Ac., xv., 48: Bot. Gaz., viii., 282.—A third locality has at last turned up for this shrub, which is so conspicuous and singular that one wonders at its so long evading notice. The peculiar flower-buds were